



Objectives

Week 2A - RESEARCH

GESTS01X- Science, Technology & Society

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Objectives

At the end of the lesson, the students are expected to:

1. shares research experiences and knowledge
2. explains the importance of research in daily life
3. describes characteristics, processes, and ethics of research
4. differentiates quantitative from qualitative research
5. provide examples of research in areas of interest*

**Examples of research may vary with accordance to specific track and strands.*

Introductory Activity

What is the first thing that comes to your mind when you encounter the word "RESEARCH" ?



Introductory Activity

Hmmm...
Let me guess!





Introductory Activity

Paperworks!!!

Sleepless
Nights...

Real Life
Eating Monster
(Panelist)

Microsoft
Wordy

And many
negative
thoughts...

Expensive
Statistician

Deadline!!!

Around the
World
Library Tours

Friendship-
Over Dramas



Come to think of it,
It is not really all
about the negative
thoughts, because...





If not
because of
research,
We are
still like
this guy...



rather than enjoying these things...



Moreover, we may still not know
the very basic knowledge like...



The shape of the Earth is
not a circle,





But an oblate spheroid.





Or even the idea of the earth

As part of Milky Way Galaxy





Now, let us find
what does
research truly
means.



Research

It is a systematic inquiry that is designed to collect, analysed, interpret data to understand , describe, or predict phenomenon (Mertens, 2015). Still, some authors emphasize that research is “the formal and disciplined application of scientific inquiry to the study of problems” (Navarro & Santos, 2011).

The above definitions imply that research is a systematic investigation of the scientific inquiry in order to find solutions to problems and contribute to knowledge in an existing concept..



IMPORTANCE OF RESEARCH

(Avilla, 2016)



IMPORTANCE OF RESEARCH

(Avilla, 2016)

1. Gather Relevant Information

The results of research(es) are used as springboard in conducting more researches or in planning new projects.



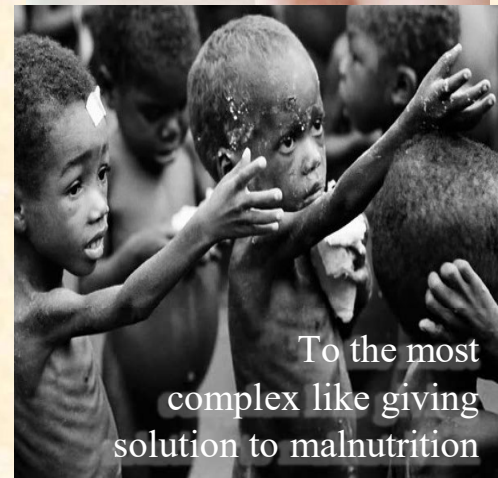
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IMPORTANCE OF RESEARCH

(Avilla, 2016)

2. Improve Quality of Life

The major breakthroughs in the field of communication, transportation, medicine, entertainment, and food and nutrition are all possible because of researches conducted, and are further improved to make people's lives convenient and comfortable.



To the most complex like giving solution to malnutrition



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IMPORTANCE OF RESEARCH

(Avilla, 2016)

3. Understand History

Research helps in tracing down history to better understand the society and also providing possible solutions to the prevailing problems of our current society.

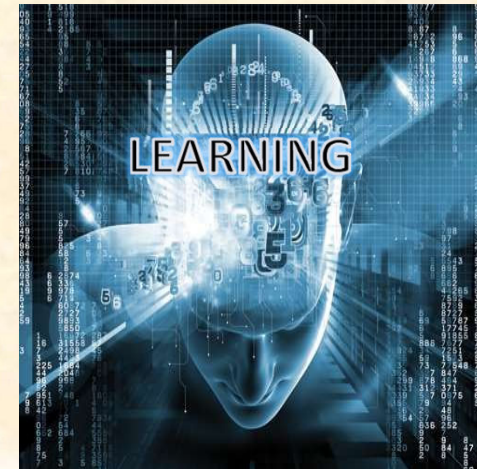


IMPORTANCE OF RESEARCH

(Avilla, 2016)

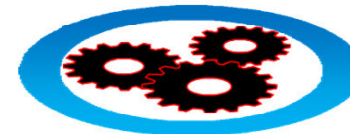
4. Personal and Professional Development

Personally, one will gain more knowledge and thus widen one's perspective about life. Professionally, research will not just meet academic excellence or school requirements but also advances people to a more challenging and exciting world of learning.



Characteristics of Research

(Avilla, 2016)



Research is Empirical.

It uses
facts and
data
obtained
through
thorough investigation.



Characteristics of Research (Avilla, 2016)



Research is Analytical.

The researcher thoroughly analyses and interprets the gathered data before arriving at a conclusion.

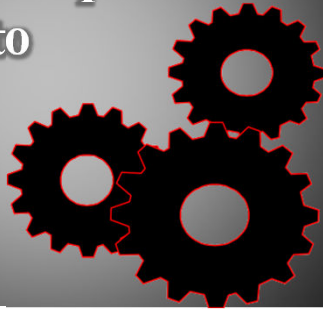
Characteristics of Research

(Avilla, 2016)



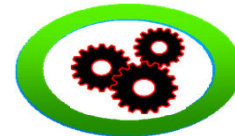
Research is Systematic.

It follows a certain method or procedure in order to obtain objective results.



Characteristics of Research

(Avilla, 2016)

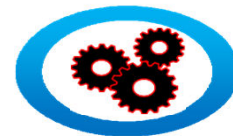


Research is Cyclical.

It begins with a problem and ends with resolution in every step in the research process is vital to the success of the research.

Characteristics of Research

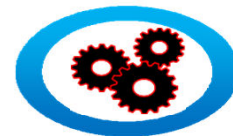
(Avilla, 2016)



Research is Original.

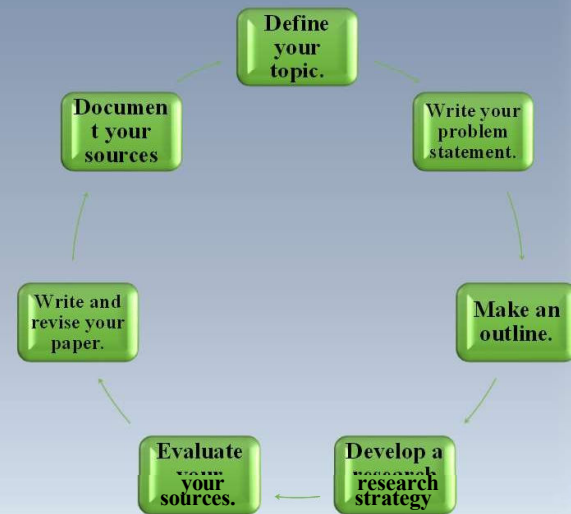
**Research output
is the product of novel
ideas and shows
authenticity.**

Characteristics of Research (Avilla, 2016)



RESEARCH PROCESSES

(Avilla, 2016)

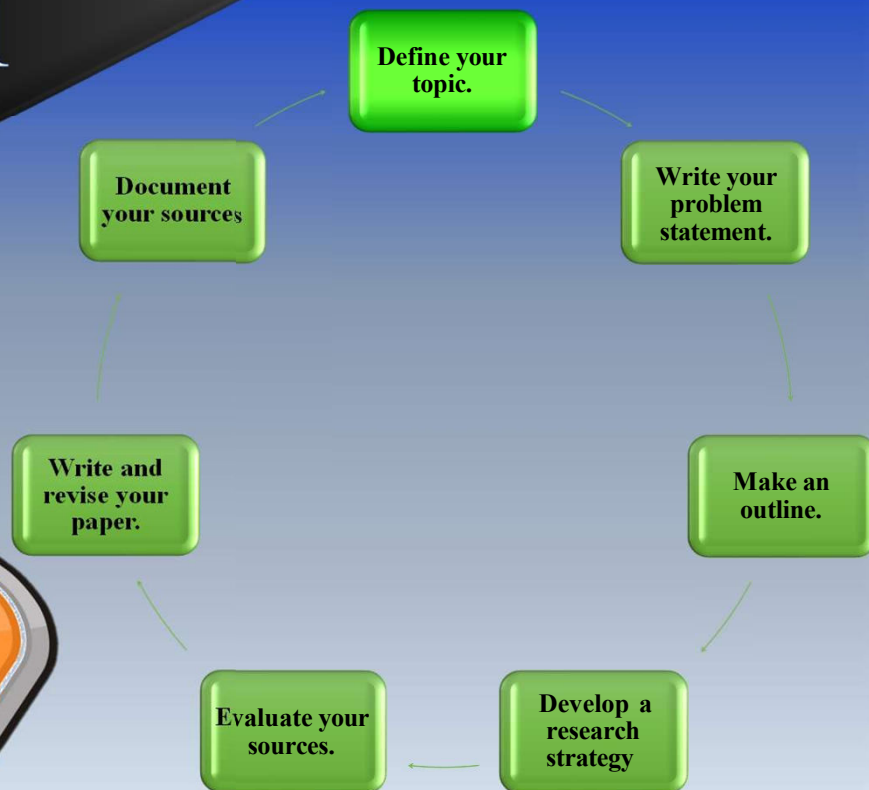


RESEARCH PROCESSES

(Avilla, 2016):

Define your topic.

Choosing and describing the topic will directly affect the research process so choose your topic wisely.

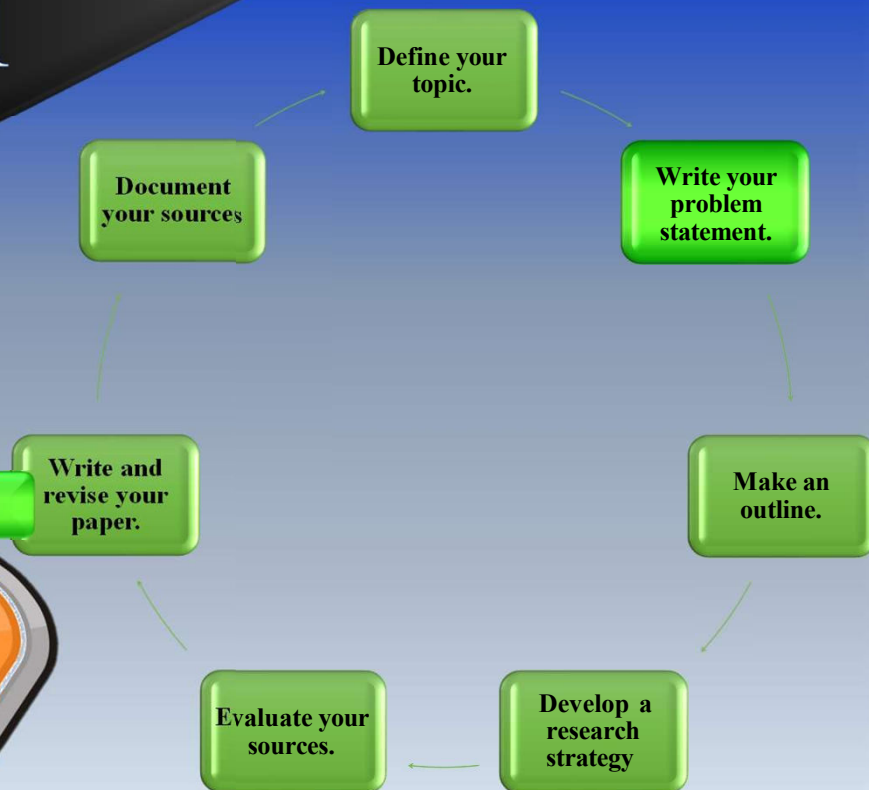


RESEARCH PROCESSES

(Avilla, 2016):

Write your problem statement.

Statement should describes what is to be tested during the entire research process or the general problem that the research aims to answer.

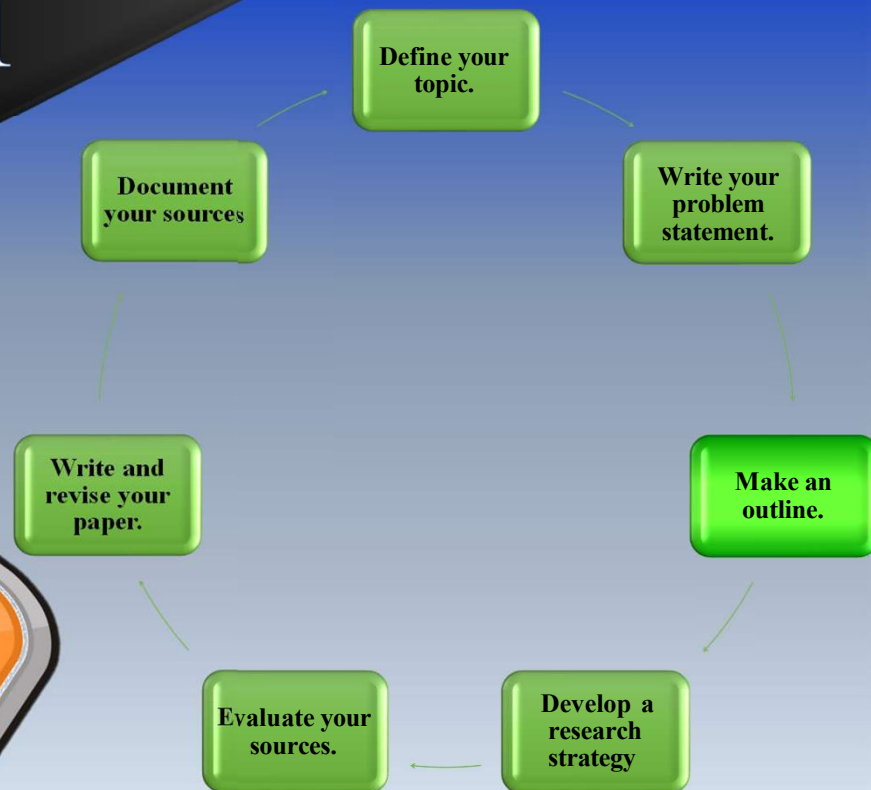


RESEARCH PROCESSES

(Avilla, 2016):

Make an Outline.

The outline in which you write all the relevant information you have gathered serves as the first draft of your paper.

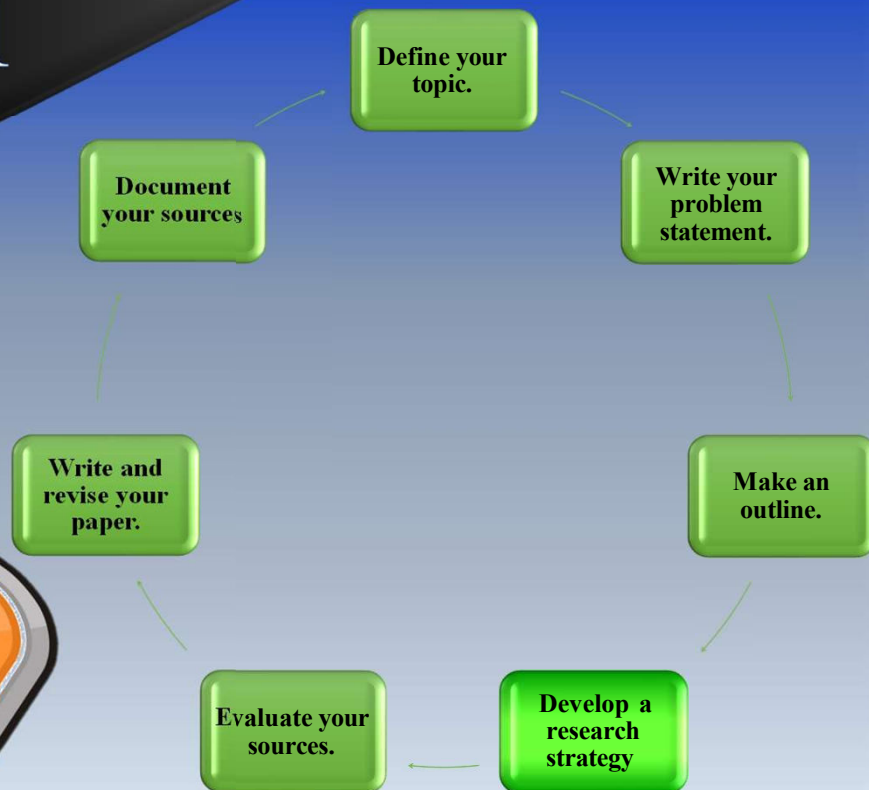


RESEARCH PROCESSES

(Avilla, 2016):

Develop a research strategy.

It will serve as your guide in setting out your objectives and priorities to minimize the time and effort you will spend in your research.

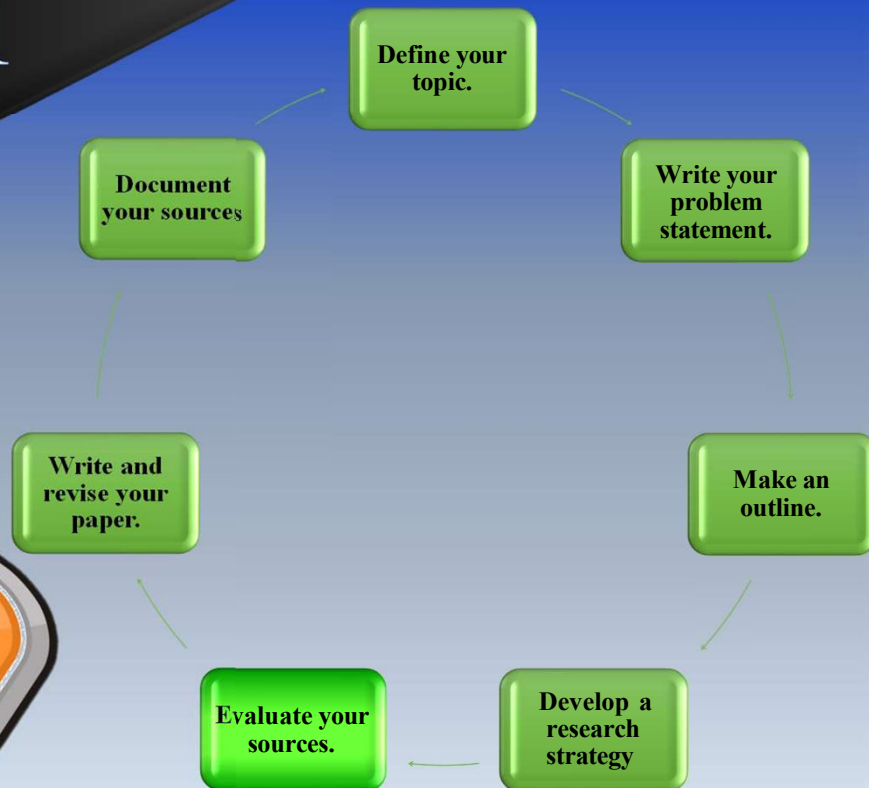


RESEARCH PROCESSES

(Avilla, 2016):

Evaluate your sources.

Check the quality and credibility of the sources by considering the authority (author and publisher), currency (date of publication, and purpose (intention of the author) of thematerial.

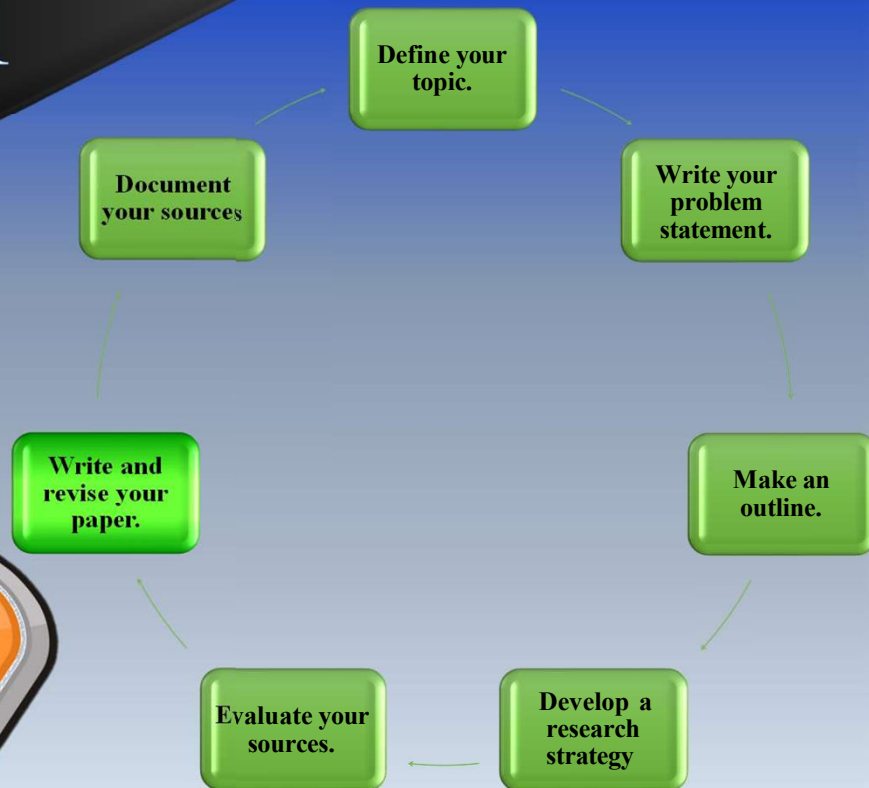


RESEARCH PROCESSES

(Avilla, 2016):

Write and revise your paper.

Check the content that in line with the chosen topic and problem statement of the research paper.

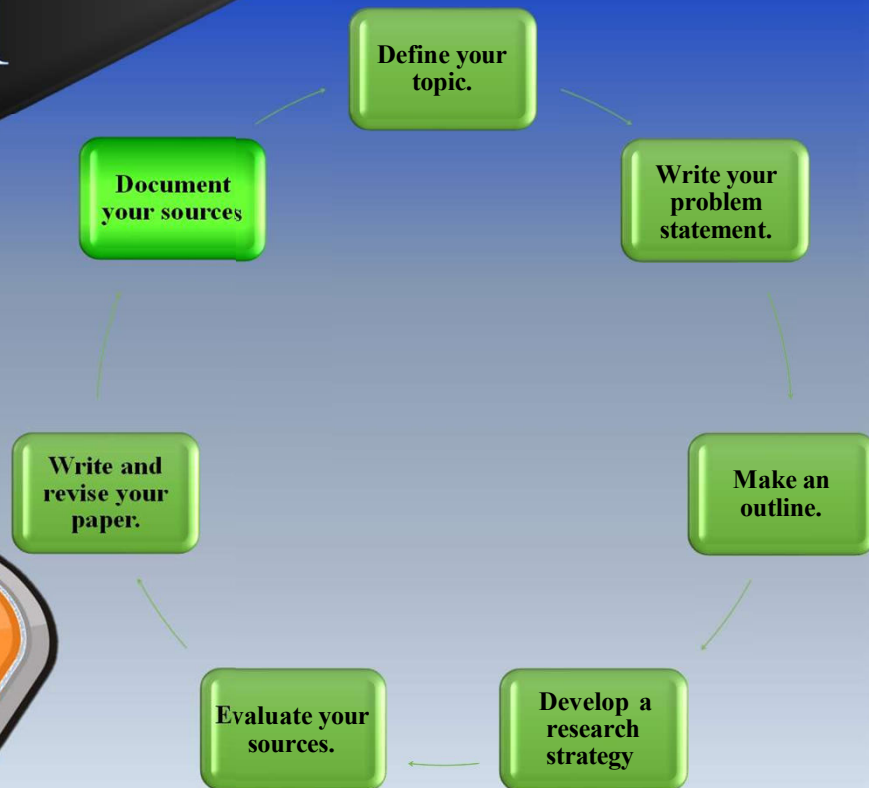


RESEARCH PROCESSES

(Avilla, 2016):

Document your sources

It is important in any research for it shows the credibility of the writer whether the ideas presented are from the author or from another source.



Ethics in Research

Research ethics relate to the standards that should be upheld to guard participants from harm or risk. Ethical considerations should be made at each stage of the research design and include informed consent, voluntary participation and respect for confidentiality.

Research establishes the moral integrity of the researchers which is crucial as it ensures that the research findings are valid and trustworthy (Avilla, 2016).



ETHICS IN RESEARCH

(Shamoo, A. & D. Resnik, 2009)

1.

Honesty

Strive for honesty in all scientific communications. Honestly report data, results, methods, and publication status. Don not fabricate, falsify, or misrepresent data.

write everything down 

ETHICS IN RESEARCH

(Shamoo, A. & D. Resnik, 2009)

2.

Objectivity

Strive to avoid bias in experimental design, data analysis, data interpretation, peer review, personnel decisions, grant writing, expert testimony, and other aspects of research where objectivity is expected.



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ETHICS IN RESEARCH

(Shamoo, A. & D. Resnik, 2009)

3.

Integrity

Keep your promises and agreements; act with sincerity; strive for consistency of thoughts and actions.



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ETHICS IN RESEARCH

(Shamoo, A. & D. Resnik, 2009)

5.

Openness

Share data, results, ideas, tools, and resources. Be open to criticism and new ideas.



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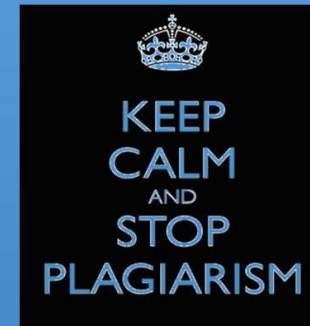
ETHICS IN RESEARCH

(Shamoo, A. & D. Resnik, 2009)

6.

Respect for Intellectual Property

Honor patents, copyrights, and other forms of intellectual property. Give proper acknowledgement or credit for all contributions to research. Do not plagiarize.



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ETHICS IN RESEARCH

(Shamoo, A. & D. Resnik, 2009)

7.

Confidentiality

Protect confidential communications and personal information of your respondents, if any.



ETHICS IN RESEARCH

(Shamoo, A. & D. Resnik, 2009)

8.

Social

Responsibility

Strive to promote social good and prevent or mitigate social harms through research, public education, advocacy.



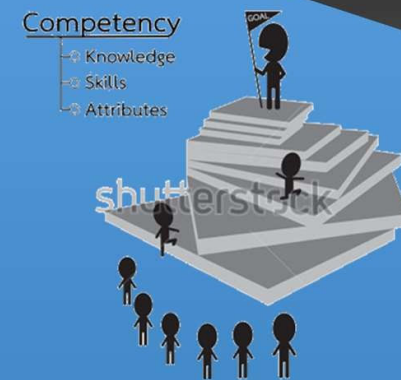
9.

ETHICS IN RESEARCH

(Shamoo, A. & D. Resnik, 2009)

Competence

Maintain and improve your own professional competence and expertise through lifelong education and learning.



ETHICS IN RESEARCH

(Shamoo, A. & D. Resnik, 2009)

10.

Legality

Know and obey relevant laws
and institutional and government
policies.



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ETHICS IN RESEARCH

(Shamoo, A. & D. Resnik, 2009)

11.

Animal Care

Show proper respect and care for animals when using them in research. Do not conduct unnecessary or poorly designed animal experiments.



ETHICS IN RESEARCH

(Shamoo, A. & D. Resnik, 2009)

12.

Human Subjects Protection

Minimize harms and risks and maximize benefits; respect human dignity, privacy, and autonomy; take special precautions with vulnerable populations; and strive to distribute the benefits and burdens of research fairly.



Quantitative



VS

Qualitative



Research



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Quantitative

It refers to the systematic empirical investigation of social phenomena via statistical, mathematical or numerical data or computational techniques.

Qualitative

It is a method of inquiry employed in different academic disciplines, traditionally in the social sciences, but also in market research and further contexts.



Quantitative

- Objective
- Research questions answer *how many* or *strength of relationship or difference*
- Literature review is usually done before the study
- Tests theory
- Measurable
- Reports statistical analysis

Qualitative

- Subjective
- Research questions answer *what* and *why*
- Literature review may be done as the study progresses
- Develops theory
- Interpretive
- Reports rich narrative, individual interpretation



Quantitative

- Basic element of analysis is numbers
- Researcher is separate
- Subjects
- Context free
- Reasoning is logistic and deductive
- Establishes relationships and causation

Qualitative

- Basic element of analysis is words or ideas
- Researcher is part of the process
- Participants
- Context dependent
- Reasoning is dialectic and inductive
- Describe meaning, discovery

Source: Anderson, John D. "Qualitative and quantitative Research." 2006.

Quantitative

Examples:

1. Students' images in chemistry
2. Gender and cultural gaps in the classroom
3. Science practices of the Mangyan tribe

Data that can be gathered in the above topics is numerical. The primary data is obtained from an experiment or from an existing document.

Qualitative

Examples:

1. Predictors of science performance
2. Growth performance of organic fertilizer
3. Population rate in Metro Manila in the next 20 years

Data that can be generated will not be numerical but symbols and verbal description. These sets of data can be best collected through interviews and observations.

Source: Avilla, Ruel A. "Practical Research 1." 2016.





Structure of a Research Paper: IMRaD Format

Reports of research studies usually follow the IMRAD format. IMRAD (Introduction, Methods, Results, [and] Discussion) is a mnemonic for the major components of a scientific paper. These elements are included in the overall structure outlined that is shown on the next page of this topic.



I. The Title Page

Title: Tells the reader what to expect in the paper.

Author(s): Most papers are written by one or two primary authors. The remaining authors have reviewed the work and/or aided in study design or data analysis (International Committee of Medical Editors, 1997). Check the Instructions to Authors for the target journal for specifics about authorship.

Keywords [according to the journal]

Corresponding Author: Full name and affiliation for the primary contact author for persons who have questions about the research.

Financial & Equipment Support [if needed]: Specific information about organizations, agencies, or companies that supported the research.

Conflicts of Interest [if needed]: List and explain any conflicts of interest.

II. Abstract: “Structured abstract” has become the standard for research papers (introduction, objective, methods, results and conclusions), while reviews, case reports and other articles have non-structured abstracts. The abstract should be a summary/synopsis of the paper.



III. Introduction: The “why did you do the study”; setting the scene or laying the foundation or background for the paper.



IV. Methods: The “how did you do the study.” Describe the --

Context and setting of the study

Specify the study design

Population (patients, etc. if applicable)

Sampling strategy

Intervention (if applicable)

Identify the main study variables

Data collection instruments and procedures

Outline analysis methods





V. Results: The “what did you find” –

Report on data collection and/or recruitment

Participants (demographic, clinical condition, etc.)

Present key findings with respect to the central research question

Secondary findings (secondary outcomes, subgroup analyses, etc.)





VI. Discussion: Place for interpreting the results

Main findings of the study

Discuss the main results with reference to previous research

Policy and practice implications of the results

Strengths and limitations of the study



VII. Conclusions: [occasionally optional or not required]. Do not reiterate the data or discussion. Can state hunches, inferences or speculations. Offer perspectives for future work.

VIII. Acknowledgements: Names people who contributed to the work, but did not contribute sufficiently to earn authorship. You must have permission from any individuals mentioned in the acknowledgements sections.



IX. References: Complete citations for any articles or other materials referenced in the text of the article.



PRACTICAL RESEARCH 1

Nature of Inquiry and Research

References

Books

- Avilla, Ruel A. (2016). DIWA Senior High School Series: Practical Research 1. DIWA Learning Systems, Inc.**
- Mertens, D. (2015). Research and Evaluation in Education and Psychology. Thousand Oaks, CA: Sage Publications, Inc.**
- Navarro, R. & R. Santos. (2011). Research-based Teaching and Learning. Quezon City: Lorimar Publishing, Inc.**
- Shamoo, A. & D. Resnik. 2009. Responsible Conduct of Research, 2nd ed. New York: Oxford University Press**

- [IMRD Cheatsheet](#) (Carnegie Mellon) pdf.
- Adewasi, D. (2021 June 14). [What Is IMRaD? IMRaD Format in Simple Terms!](#) Scientific-editing.info.
- Nair, P.K.R., Nair, V.D. (2014). [Organization of a Research Paper: The IMRAD Format](#). In: Scientific Writing and Communication in Agriculture and Natural Resources. Springer, Cham. https://doi.org/10.1007/978-3-319-03101-9_2
- Sollaci, L. B., & Pereira, M. G. (2004). [The introduction, methods, results, and discussion \(IMRAD\) structure: a fifty-year survey](#). ~~date 1/4/23~~ *Journal of Management Education*, 364–367.
- Cuschieri, S., Grech, V., & Savona-Ventura, C. (2019). [WASP \(Write a Scientific Paper\): Structuring a scientific paper](#). ~~Journal of Management Education~~ *Journal of Management Education* 114–117. <https://doi.org/10.1016/j.jearlhumdev.2018.09.011>

- [IMRD Cheatsheet](#) (Carnegie Mellon) pdf.
- Adewasi, D. (2021 June 14). [What Is IMRaD? IMRaD Format in Simple Terms!](#) Scientific-editing.info.
- Nair, P.K.R., Nair, V.D. (2014). [Organization of a Research Paper: The IMRAD Format](#). In: Scientific Writing and Communication in Agriculture and Natural Resources. Springer, Cham. https://doi.org/10.1007/978-3-319-03101-9_2
- Sollaci, L. B., & Pereira, M. G. (2004). [The introduction, methods, results, and discussion \(IMRAD\) structure: a fifty-year survey](#). ~~date 1/4/23~~ *Journal of Management Education*, 364–367.
- Cuschieri, S., Grech, V., & Savona-Ventura, C. (2019). [WASP \(Write a Scientific Paper\): Structuring a scientific paper](#). ~~Journal of Management Education~~ *Journal of Management Education* 114–117. <https://doi.org/10.1016/j.jearlhumdev.2018.09.011>